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ABSTRACT

A gap exists between talk about teaching that is featured in most preservice teacher education and the working knowledge and problem-solving expertise that characterize skilled teaching. This gap exists because typical teacher training does not embody the principles of modeling, coaching, scaffolding, articulation, and reflection. Three methods which make use of these principles include reciprocal teaching, Reading Recovery, and the Kamehameha Early Education Program (KEEP) in Hawaii. These same principles can and should be applied more broadly to the education of reading teachers. One way prospective teachers can witness authentic practice is through the use of videotapes of real classrooms. Videotechnology would increase the value of the classroom experience for the teacher trainee and decrease the time and energy the education professor would otherwise have to spend on ancillary matters. This time could be invested in scrutiny of the trainees' videotaped lessons. Prospective teachers could be trained to analyze each other's tapes, an experience which would afford more than the implementation of a lesson containing good and improvable points. It provides a forum for prospective teachers to reflect on a teaching experience, share their ideas, support their suggestions, and gain insight into the nature of teaching. The professor's theoretical information comes to life as a result of its contextualization. The use of videotapes in these ways offers the most feasible avenue open to improve the quality of teacher education and assure higher returns on the nation's investment in literacy. (MG)

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CENTER FOR THE STUDY OF READING

Technical Report No. 487

A MODEST PROPOSAL FOR IMPROVING THE EDUCATION OF READING TEACHERS

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Abstract

The usual preservice teacher education program suffers from several shortcomings. Notably it tries to transmit knowledge and skills in the abstract, decontextualized from their uses in classrooms. Such classroom experience as preservice teachers are able to get is difficult for them to interpret and only loosely related to teaching methods courses. This report offers several principles for developing expertise that could improve preservice teacher education. These principles could be incorporated into teacher training with the use of videotechnology. Preservice teachers could videotape each other teaching several times a semester. Close analysis and discussion of the tapes could be made the centerpiece of university teacher education courses.

A MODEST PROPOSAL FOR IMPROVING THE EDUCATION OF READING TEACHERS

Common sense and educational research converge on the conclusion that the quality of teaching that children receive is a major determinant of their progress in reading, writing, and the other language arts. It is an easy step to the further conclusion that improving teacher education is a major lever for raising the level of literacy. In the words of *Becoming a Nation of Readers* (Anderson, Hiebert, Scott, & Wilkinson, 1985, p. 3), "The knowledge is now available to make worthwhile improvements in reading throughout the United States. If the practices seen in the classrooms of the best teachers in the best schools could be introduced everywhere, the improvements would be dramatic."

The "best teachers" have an expert understanding of the complex ecological habitat, the dynamic ecosystem that is the classroom. This understanding enables them to make rapid-fire decisions about complex, ill-structured situations as they struggle to achieve balance in the classroom system. Expert teachers solve multiple problems efficiently and effectively.

What does it mean to have an expert's understanding? For example, what does an experienced physician know about diagnosing a medical problem that a beginning medical student does not know? What does an expert reader know about acquiring information from a textbook that is still mysterious to a novice reader? What does an expert teacher know about managing the classroom ecosystem that a beginning teacher does not know?

The general form of the answer to these questions appears to be that experts in any domain have not only good problem-solving strategies but also a rich store of knowledge about the domain. Experts have had so much experience with problems that they can rapidly recognize the type of problem and select an appropriate strategy to solve it. They have learned to integrate artfully "knowing that" with "knowing how." The knowledge of experts is organized in large units; they perceive order and pattern in what seems chaos to novices. Experts have a wide repertoire of routines that they perform automatically and fluently, which frees their mental resources for more complicated problem-solving strategies.

What do expert teachers know? They possess a rich body of knowledge, including knowledge of curriculum and content; of learners and their characteristics; of the ends, purposes, and values of education; and of educational contexts (Shulman, 1987). In addition, expert teachers have organized problem-solving strategies and routines at various levels of generality. For example, teachers may have a global routine for conducting reading lessons, with specific routines for correcting errors, managing independent seatwork, and handling disruptions. Expert teachers negotiate "knowing that" and "knowing how" as they plan, predict, anticipate and solve problems, estimate what students know and don't know, revise teaching plans, and make the most of unexpected opportunities.

Typical "preservice" education (the training that prospective teachers receive prior to becoming certified teachers) falls short of preparing teachers to be expert problem solvers. Teachers frequently assert that education courses contributed little to their development as teachers. Generations of teachers have complained that so-called "foundation" courses in psychology and philosophy, which are supposed to transmit "knowing that," and even teaching methods courses that disseminate "knowing how," were woefully inadequate in preparing them to cope with the complex problems of real classrooms. Teachers who excel in all their university courses and score high on credentialing exams may still flounder in real classrooms. Why is this the case?

We believe that the usual preservice education is ill-suited to training experts because knowledge and skills are taught in the abstract, decontextualized from their uses in the classroom. The medium of preservice instruction is the spoken and written word. We submit that there are inherent limits on the value of verbal formulations of knowledge about expertise. Few people would try to become expert chess or bridge players by studying a thick book on the subject. It is the rare person whose first step in attempting to master a new computer program would be to read the technical manual from cover to cover. No basketball coach begins preparing players by offering a six-hour lecture-discussion course.

The way to expertise in chess, computers, basketball, or any other domain is to intermingle spoken or written advice with actual attempts by the student to perform in authentic settings. Typically, the only

opportunity for performance in an authentic setting for teacher trainees is during student teaching, when the trainees go out into the schools for field experience. Student teaching is universally rated as the most valuable part of teacher preparation. As one first-year teacher maintained, "I learned more in the first month of student teaching than in all my coursework combined." Student teaching is essential to giving would-be teachers a taste of reality and an opportunity to practice knowledge and skills.

However, there are still several problems with student teaching as it is typically practiced. First, it is too little, too late. It is often the culminating experience of preservice training. It usually lasts a few short months and takes place in only one classroom. The amount of actual practice a teacher trainee receives varies widely, depending on school policy, whether the regular classroom teacher will relinquish control, the amount and quality of supervision, and so on.

Second, prospective teachers may not see models of good teaching. If they do see good teaching, they may not be able to determine what makes it good. Because only one or two members of a preservice education class will see a given lesson, they have no common experience to discuss with their instructor and classmates. Furthermore, student teachers receive infrequent feedback of indifferent quality on their own teaching. They are preoccupied with mastering unfamiliar routines, maintaining attention and discipline, and above all, presenting themselves well. Inevitably, they have neither the time nor the inclination to reflect on the fine points of pedagogy.

Thus, the training of prospective teachers often leads to inert, inaccessible know-ledge that beginning teachers are unable to translate into practice and develop into expertise. That abstractly stated advice may be an uncertain guide for action is best appreciated in the context of particular cases. Consider, for example, children's oral reading mistakes. Prospective reading teachers will be told that research shows (and it does) that children's year-to-year growth in reading is greater when oral reading errors are followed with "sustaining feedback" rather than "terminal feedback." Sustaining feedback, the aspiring teachers will be further told, means giving the child a hint; terminal feedback means telling the child the word.

The foregoing advice will enable the prospective reading teacher to answer correctly a multiple choice item, such as "Usually, the best practice when a child makes an oral reading mistake is (a) ignore the mistake, (b) provide the word, (c) give a hint, (d) ask another child." But the advice is too impoverished to enable the teacher to deal skillfully with oral reading errors in actual practice. What counts as a mistake? Should a teacher deal with every mistake? What sorts of hints are most effective? With which sorts of children? Under what conditions? For instance, should there be a different tactic for handling the substitution of *house* for *home*, *house* for *horse*, *growed* for *grew*, and *blake* for *black*? Should a teacher pause before giving a hint or jump in immediately? Should other children be encouraged or discouraged from offering help? Comparably difficult questions arise when a child's answer to a question suggests a comprehension problem. Does the student lack relevant background knowledge? Are individual words the problem, or is it their meaningful integration? Does the answer really reflect a lack of comprehension, or does the child understand but fail to remember the appropriate information? And so on. The answers to these questions are not straightforward, yet a practicing primary-school teacher must answer them many times a day within a time frame calibrated in seconds.

Whereas formal training often has embarrassingly little influence on how teachers teach, there is no doubting the influence of teachers' prior personal experience as students. According to Lortie (1975, p. 221), "Teachers start their professional preparation early in life; their entire school experience contributes to their work socialization." Notice that the amount of prior experience prospective teachers have with practicing teachers and teaching is a couple of orders of magnitude greater than the amount that, say, prospective doctors have with practicing doctors and doctoring. By the time young people have graduated from high school they have clocked more than 10,000 hours of class time. Inevitably this experience makes a deep impression. Getting new teachers seriously to entertain alternative approaches to teaching requires freeing them from the "hand of the past" (Nemser, 1983, p. 153).

The inadequacies of formal training and the heavy "hand of the past" are no doubt major reasons why teachers are slow to change, and why in the nation's classrooms text-bound recitation is more common than genuine discussion and drill and practice are more common than opportunities for discovery. Observation in classrooms suggests instruction seldom does much to promote reasoning about texts as a whole or reasoning beyond the given. For example, in a series of observations completed in the mid

1970s, reading and social studies teachers were seen to devote just one quarter of one percent of instructional time to comprehension instruction that went beyond the meanings of individual words (Durkin, 1978-79). In another well-known study done a decade earlier, 70% of the questions elementary teachers were observed to ask during classroom discussions required no more than literal recall or recognition of the information in textbooks (Guszak, 1967). A study done in the mid 1980s, however, found that only 43% of teachers' questions could be satisfied with a literal answer, while the rest required at least some reasoning (O'Flahavan, Hartman, & Pearson, 1989). Thus, there may be a trend toward instruction that demands more thinking from students, although there is still plenty of room for improvement.

So far we have tried to portray the shortcomings of the current method of educating reading teachers and to explain why this is one reason classrooms are often not very intellectually stimulating. What do we propose as an alternative? We begin with some effective principles for training experts, borrowed from analyses of apprenticeship (Brown, Collins, & Duguid, 1989; Collins, Brown, & Newman, 1989). An underlying principle is that learning and acting are intimately related. Learning results from acting in authentic situations. Therefore, practice in situ is essential to becoming an expert. Collins, Brown, and Newman (1989) discuss the following specific principles for fostering expertise.

1. **Modeling**. Apprenticeship begins with the observation of a master or expert, who models the process. By reflectively "thinking aloud," the expert makes explicit invisible mental processes that might otherwise remain mysterious to novices. Observation helps learners develop a conceptual model of the task before attempting to execute it.

2. **Coaching**. Coaching involves observing and helping students as they attempt to execute the process. The coach directs students to particular aspects of the task, reminds students about a part of the task they may have overlooked, provides hints and feedback, and designs and sequences new tasks aimed at bringing the students' performance closer to expert performance.

3. **Scaffolding**. Scaffolding consists of the support the coach provides as the students continue practice. Scaffolding may be in the form of hints or suggestions. Or, the coach may perform parts of the task students cannot yet manage on their own. Appropriate scaffolding requires accurate diagnosis of the students' skill level and the ability to provide just the right amount of support to enable the student to perform the target task. The gradual removal of scaffolding as students assume greater independence is known as fading.

4. **Articulation**. Articulation refers to getting students to articulate their know-ledge, reasoning, or problem-solving strategies. Articulation helps students gain consciousness of and control over basic conceptual and procedural knowledge.

5. **Reflection**. Reflection involves comparing one's own conceptual and procedural understandings with those of an expert, or another student, and eventually internalizing a model of expertise. The goal is to develop reflective thinkers who can monitor their own performance and, if necessary, bring it more in line with expert performance. Technology such as video- and audiotapes or computers can be employed to provide a medium for reflection. For example, the "think aloud" protocols of experts and novices as they perform a common task might be compared.

The foregoing principles are exemplified in several powerful teaching programs involving reading. We describe three of these programs in the following sections. All three programs teach reading, but in our discussion of successful programs we shall emphasize, respectively, the education of the children, the education of the teachers, and the education of the teachers of the teachers.

Reciprocal Teaching

A notable example of a method for successfully teaching children to read with comprehension is Palincsar and Brown's (1984) reciprocal teaching. The method centers on modeling and coaching students in four basic reading comprehension strategies: formulating questions based on the text, summarizing the text, making predictions about what will come next, and clarifying difficulties in understanding the text. The name "reciprocal teaching" comes from the fact that the teacher and students take turns playing the role of the teacher.

In reciprocal teaching, the teacher begins by modeling the strategies. After she and the students have read a paragraph silently, she asks a "main idea" question based on the paragraph, formulates a summary, makes a prediction about what the next bit of text will be about, and clarifies any confusing or obscure ideas. As the students begin to learn the process, the teacher provides scaffolding by coaching them on how to construct good questions and summaries, prompting, encouraging, and offering feedback on their efforts. As the students become more proficient, the teacher gradually withdraws the support. She assumes the role of monitor, occasionally providing prompts or feedback.

The following example of reciprocal teaching illustrates the dramatic improvement over two weeks of instruction for a seventh-grade minority student, Charles, who is a weak reader (from Palincsar & Brown, 1984).

Day 1:

TEXT: The water moccasin, somewhat longer than the copperhead, is found in the southeastern states. It lives in swampy regions. It belongs, as do also the copperhead and the rattlesnakes, to a group of poisonous snakes called pit vipers. They have pits between their eyes and their nostrils which, because they are sensitive to heat, help the snakes tell when they are near a warm-blooded animal. Another name for the water moccasin is "cottonmouth." This name comes from the white lining of the snake's mouth.

1. *Charles*: What is found in the southeastern snakes, also the copperhead, rattlesnakes, vipers--they have. I'm not doing this right.

2. *Teacher*: All right. Do you want to know about the pit vipers?

3. *Charles*: Yeah.

4. *Teacher*: What would be a good question about the pit vipers that starts with the word "why?"

5. *Charles*: (No response.)

6. *Teacher*: How about, "Why are the snakes called pit vipers?"

7. *Charles*: Why do they want to know that they are called pit vipers?

8. *Teacher*: Try it again.

9. *Charles*: Why do they, pit vipers in a pit?

10. *Teacher*: How about, "Why do they call the snakes pit vipers?"

11. *Charles*: Why do they call the snakes pit vipers?

12. *Teacher*: There you go! Good for you.

Day 4:

TEXT: Spinner's mate is much smaller than she, and his body is dull brown. He spends most of his time sitting at one side of her web.

13. *Charles*: (No question.)

14. *Teacher*: What's this paragraph about?

15. *Charles*: Spinner's mate. How do spinner's mate. . .

16. *Teacher*: That's good. Keep going.

17. *Charles*: How do spinner's mate is smaller than. . . How am I going to say that?

18. *Teacher*: Take your time with it. You want to ask a question about spinner's mate and what he does, beginning with the word "how."

19. *Charles*: How do they spend most of his time sitting?

20. *Teacher*: You're very close. The question would be, "How does spinner's mate spend most of his time?" Now, you ask it.

21. *Charles*: How does spinner's mate spend most of his time?

Day 7:

TEXT: Perhaps you are wondering where the lava and other volcanic products come from. Deep within our earth there are pockets of molten rock called magma. Forced upward in part by gas pressure, this molten rock continually tries to reach the surface. Eventually--by means of cracks in the crustal rocks or some similar zone of weakness--the magma may break out of the ground. It then flows from the vent as lava, or spews skyward as dense clouds of lava particles.

22. *Charles*: How does the pressure from below push the mass of hot rock against the opening? Is that it?

23. *Teacher*: Not quite. Start your question with, "What happens when?"

24. *Charles*: What happens when the pressure from below pushes the mass of hot rock against the opening?

25. *Teacher*: Good for you! Good job.

Day 11:

TEXT: One of the most interesting of the insect-eating plants is the Venus's flytrap. This plant lives in only one small area of the world--the coastal marshes of North and South Carolina. The Venus's flytrap doesn't look unusual. Its habits, however, make it truly a plant wonder.

26. *Charles*: What is the most interesting of the insect eating plants, and where do the plants live at?

27. *Teacher*: Two excellent questions! They are both clear and important questions. Ask them one at a time now.

Day 15:

TEXT: Scientists also come to the South Pole to study the strange lights that glow overhead during the Antarctic night. (It's a cold and lonely world for the few hardy people who "winter over" the polar night.) These "southern lights" are caused by the Earth acting like a magnet on electrical particles in the air. They are clues that may help us understand the Earth's core and the upper edges of its blanket of air.

28. *Charles*: Why do scientists come to the south pole to study?

29. *Teacher*: Excellent question! That is what this paragraph is all about.

At the beginning of instruction, Charles is unable to formulate a question. The teacher coaches Charles by stating the main idea (Statement 2), providing a clue about how to begin the question (4), and finally resorting to forming the question for him (6). But Charles even has difficulty imitating the teacher's question (7, 9). On Day 4, the teacher waits longer for Charles to try to formulate an adequate answer, providing encouragement (16), and prompting (14, 18), before again suggesting a question for him (20).

As Charles improves, the teacher "fades" her direct help and demands greater participation from him. Finally, by Day 15, Charles can form good questions independently.

Reciprocal teaching is an extremely successful method. It has proven effective with poorer readers at several grade levels, and in both small group and whole class settings.

Reading Recovery

Reading Recovery is another highly successful program that makes integral use of coaching, in this case in both the education of the children and in the training of the teachers themselves. Pioneered in New Zealand, the program was first introduced in this country in Ohio by Ohio State University, the Columbus Public Schools, and the Ohio Department of Education. The program has now been introduced throughout Ohio and is beginning to spread to other states. The Center for the Study of Reading is sponsoring the program in Illinois.

The goal of Reading Recovery is to help the poorest readers in a class make accelerated progress, until they read as well as or better than the average children in the class. When properly implemented, the program appears to achieve this ambitious goal. It is reported that after an average of 12 weeks of instruction, more than 95% of New Zealand children who participate in the program make normal progress in reading thereafter (Clay, 1985). The success rate in Ohio currently is reported to be 85% (Pinnell, DeFord, & Lyons, 1988). It should be stressed that the available data suggest that the gains produced by Reading Recovery persist over a period of years.

As implemented in this country, Reading Recovery provides a second chance for children who are failing to learn to read in the first grade. Children who fall into the lowest 20% in reading within a class are provided 30-minute one-on-one lessons every day by a teacher trained in the strategies and techniques of Reading Recovery. The typical lesson includes rereading of books introduced in previous lessons, reading a new book at what is supposed to be at just the right level of challenge, composing and writing a brief story, and word study and analysis. The teacher employs special techniques intended to help children develop fluency and use the strategies that are characteristic of successful readers.

Reading Recovery teachers are selected from among experienced elementary school teachers. They receive a year of intensive training in Reading Recovery methods and strategies. The goals are for teachers to become sensitive observers of children's reading and writing and to develop facility in making moment-by-moment diagnoses upon which to base instructional decisions. The creators of Reading Recovery say that the program "does not come in a box"; they claim the program depends upon carefully nurtured teacher expertise. A group of outside educators and scholars who evaluated Reading Recovery in Ohio concurred that the program would achieve uncertain results if teacher training were attenuated.

A notable feature of Reading Recovery training is supervised implementation of the program with at-risk children. Under the guidance of a trained teacher leader, teachers in training critique each other as they teach children behind a one-way window. At each session, two of the teachers bring children whom they tutor regularly and conduct lessons "behind the glass." On the other side of the glass, the rest of the teachers in training observe and engage in what is usually a vigorous discussion of all aspects of the lesson. The teacher leader provides scaffolding by prodding the group with rapid-fire, Socratic-style questions about the children's behavior and what may be inferred from the behavior about the children's reading strategies, the appropriateness of the books, the pacing of the lesson, the teacher's decisions at choice points, the teacher's control of key techniques, and whether opportunities were seized or lost. Trainees can be heard to applaud the teacher who has managed to convey a "powerful example." At other times, they can be heard frankly to challenge ill-considered decisions. A discussion exemplifying articulation and reflection continues when the two teachers who have taught behind the glass rejoin the group.

To reach a high proportion of first graders failing to learn to read had seemed an almost impossible dream before Reading Recovery. And, the consistent success the program is able to achieve would almost certainly be impossible without excellent teacher training.

Kamehameha Early Education Program

Another highly successful program, the Kamehameha Early Education Program (KEEP) in Hawaii, makes integral use of modeling, coaching, and scaffolding for educating children, training their teachers, and training "consultants" who provide continuing training for the teachers. It is the education of this third layer of professionals that we will stress in the following discussion.

KEEP was developed to ameliorate the poor reading and high incidence of school failure among native Polynesian-Hawaiian children. Over a period of years, children who have participated in KEEP have averaged near the 50th percentile on standardized reading texts, whereas comparable children without the program have averaged near the 25th percentile (see Au et al., 1985).

The KEEP program involves a scope and sequence chart detailing the specific skills that must be mastered and the best order for introducing them. Criterion-referenced tests matching the skills are administered at least once every two weeks. The program features lively, intellectually stimulating discussions of stories in which the teacher leads the children to see deeper themes that relate to their own background or experience. KEEP attempts to maximize the fit between the culture of the home and the culture of the school, building upon the skills and knowledge that children acquire in their home culture. One way this is done is through learning centers in which children cooperate to teach and learn from one another. Another way is through the "talk story," a pattern of interaction found in Hawaiian homes in which people cooperate in developing stories and in which more than one person may speak at once. KEEP teachers encourage talk-story style discussions during reading lessons. The children may speak when they wish, without waiting for the teacher to call on them, and they collaborate in explicating the story and advancing their understanding of its meaning.

KEEP is a complicated, highly structured program that is demanding to teach and requires high levels of teacher expertise, preparation time, and energy. Yet the program is implemented with a fairly high degree of fidelity in a far-flung network of schools around the state of Hawaii. One key to KEEP's success is especially trained "consultants" (Bogert & Kent, 1988). Working with four to six classroom teachers is a full time job for a consultant. Consultants spend more time with beginning KEEP teachers than they do with experienced teachers, but they spend at least a half hour a week in the classrooms of every teacher, including veterans regarded as master teachers. The consultants provide the coaching, support, and feedback that inform and sustain the practicing teacher.

The consultant must have a broad background in the foundations of the KEEP program and a great deal of specific knowledge about how reading, writing, and language are handled within the program. Since the consultant's job is to train others, skills in classroom observation, a working knowledge of curriculum design and techniques of effective teaching, and abilities in trouble shooting and problem solving are essential. Also necessary are the interpersonal skills for working with others and the communication skills for delivering informative advice and feedback.

KEEP consultants receive a year of training that involves reading followed by discussion, guided observation of both live and videotaped lessons, and role playing (Bogert & Kent, 1988). Consultants-in-training observe and critique videotapes of exemplary and less exemplary illustrations of each teaching strategy. As part of their training for teaching strategies, each consultant trainee prepares and teaches a series of 15- to 20-minute small group reading lessons. These lessons are taught in real classrooms and are videotaped. Each trainee has multiple opportunities to observe his or her own lessons as well as those of the other trainees.

In short, it would appear that KEEP's success can be attributed to excellent teaching of children, excellent training of teachers, and excellent training of teachers of teachers. It is doubtful that the program could consistently achieve such good results without excellence at each of these levels.

The examples of reciprocal teaching, Reading Recovery, and KEEP illustrate how programs that embody the principles we espouse can succeed in developing expertise in children, teachers, and teachers of teachers. We believe that these same principles can and should be applied more broadly to the education of reading teachers.

The first principle that should be used more broadly is modeling: By observing an expert perform the task, the novice begins to form a conceptual model of the process. Because preservice education takes place mostly in college and university classrooms, observing experts in authentic situations can be problematic. We propose that one way prospective teachers can witness authentic practice is through the use of videotapes of real classrooms. We further propose that modeling include not only the models of expert practice, but also models of various stages of developing expertise. In the case of teaching reading, videotapes could capture both good and not-so-good reading lessons. The teachers whose lessons are taped could be encouraged to reflect about what they are thinking and doing during a lesson. Since such reflection would probably disrupt the lesson, the teacher models could delay sharing their reflections until immediately after the lesson.

Videotapes not only enable modeling, but also provide the medium for realizing the other principles of effective instruction. Practice in authentic situations with coaching and scaffolding is critical to becoming an expert. Would-be teachers need the opportunity to translate what they have learned in content and methods courses and what they have observed of teacher models into actual practice, with coaches to guide and support them. The best arrangement would be to have opportunities to "do" coached teaching distributed throughout the education of reading teachers rather than massed at the end of the program of study. Ideally, in other words, candidate teachers would participate in an iterative cycle of theory-observation-practice-coaching that closely approximates the training of experts in many other fields.

We are by no means the first to believe that the best teacher training would involve modeling and practice with coaching and scaffolding. Yet these features have never been seriously tried in mass teacher education. One reason is that education courses are typically staffed by a single instructor who cannot possibly provide as much coaching as is really needed. The kind of teacher training we advocate would be prohibitively expensive under today's formulas for funding teacher education.

The foregoing analysis leads us to advance a modest proposal. Send prospective teachers out into the schools with inexpensive TV cameras and video recorders. Ask them to tape fellow teacher trainees and their pupils several times a semester during reading, writing, and language lessons. Make the close analysis and discussion of the tapes the centerpiece of university courses on methods of teaching reading and language arts.

This proposal is economically and logistically viable. A camcorder, extra microphones, tripod, and monitor can be purchased for $1,750 or less. Assuming that four to six teacher trainees could share one set of equipment, the basic capital outlay for a school of education graduating 50 elementary school teachers a year would be less than $20,000. Candidate teachers could tape themselves. An even better idea, we think, is for them to work in pairs. One week one teacher trainee prepares and teaches a lesson on camera. The other teacher trainee records the lesson and critiques it. The next week, the two switch roles.

Videotechnology allows leveraged use of the time of professors in education courses. Experience in the schools often is not even a part of reading and language arts methods courses, because it is not perceived to be valuable enough to be worth the time and trouble. When field experience is included in a methods course, it usually happens without the direct involvement of the education professor. Traveling from school to school, chatting with principals, and so on makes inefficient use of the professor's time. We believe that employing videotechnology would increase the value of the classroom experience for the teacher trainee and decrease the time and energy the education professor would otherwise have to spend on ancillary matters. This time could be invested in scrutiny of the teacher trainees' videotaped lessons. However, in our plan, so much videotape would be recorded that education professors could not look at it all. Instead, they could train the prospective teachers to analyze each other's tapes. Continuing the coaching metaphor, the professor might be thought of as the "head coach."

We envision a semester-length, three-hour, lecture-discussion course. One hour would be spent providing information about the teaching of reading or language arts. This time should be rich in pedagogical principles, and should provide a sound, theoretical basis for teaching reading. The complement to verbalized theory would be the videotaped modeling of expert and not-so-expert practice. The professor would bridge theory and modeling in two ways: by judiciously selecting tape segments that illustrate key points, and by focusing the discussion on important issues illustrated by the target

segments. The professor would need to ensure that students understand the critical attributes that differentiate better from poorer lessons. The professor would also need to reconcile any discrepancies between theory and practice and between the explanation and rationale offered by the model teachers and the observed effects on the classroom.

On their own time, the teacher trainees would engage in teaching and videotaping lessons in classrooms as previously described. The remaining two hours of university class time would be devoted primarily to critical analysis of videotapes of the trainees' lessons. Assuming ten enrollees per discussion section, there would be time for each student teacher to have about three lessons orally critiqued. The remaining lessons could be analyzed in writing by other teacher trainees and, occasionally, by the professor.

The key to the success of the student teaching-videotaping sessions is how they are handled in these two-hour discussion-critique periods. These sessions provide the opportunity for coaching, scaffolding, articulation, and reflection. Coaching by the professor is important, but we think the participation of peers in a collaborative learning enterprise is invaluable in developing articulation and reflection. By critiquing each other's lessons, teacher trainees learn to articulate their knowledge and understanding; they also have an opportunity for reflection by comparing their own skills with those of others at varying levels of expertise. A videotape is probably even better suited than a real lesson to developing articulation and reflection. A videotape can be stopped for discussion; a live lesson goes on, and discussion while it is taking place may be distracting. Illuminating episodes captured on videotape can be viewed a second time; a live lesson does not permit instant replay. The following scenario illustrates how we think a discussion session might go.

The scenario begins with the professor addressing reading vocabulary. Her presentation includes a range of theoretical ideas, research-based information, and classroom lore about vocabulary growth and development, the role of vocabulary knowledge in reading comprehension, how to select words to preteach, the characteristics of effective vocabulary instruction, and specific suggestions about instructional activities. The professor uses key concepts from her presentation to demonstrate three recommended components of vocabulary instruction. Next, the class members and professor work together to design a vocabulary lesson based on the first chapter of *Charlotte's Web*, a book the prospective teachers read in a children's literature class. Finally, they review the information and analyze its usefulness.

This segment extends the typical lecture format in several ways. First, the professor intentionally models the abstractly presented ideas using vocabulary that might be new to the class members themselves. Second, the professor interacts with them about the techniques for applying the ideas. Finally, class members reflect upon the entire process. In essence, the professor attempts to incorporate the five principles for fostering expertise: modeling, coaching, scaffolding, articulation, and reflection.

Next, the prospective teachers design lessons that focus on vocabulary to implement with their students. All have their lessons videotaped by their partners. Some have their lessons formally critiqued in the discussion sessions. The scenario continues with a discussion session. This day, a discussion group reviews a lesson designed and taught by Kate, one of the prospective teachers in the class. Prior to starting the tape, Kate shares her planning with her nine classmates.

Kate: I'm assigned to a third-grade class. I work with a group of five students. For this lesson I selected *The White Stallion*, a selection from their basal reader. I selected six words to preteach: *Conestoga wagon, mustang, mare, Guadaloupe River, stallion,* and *coyote*.

John: Why did you select those words?

Kate: Well, I read the story and selected words that were crucial to its plot and that I didn't think the students would know. From those, I selected the ones that lacked sufficient contextual information for their understanding.

Professor: Do the rest of you think she planned appropriately?

Mildred: I think she used reasonable criteria. You want to teach the necessary but unknown words that students can't figure out by themselves.

Susan: Yes, but you're supposed to teach words that have general value. . . You know, words that will have some value beyond this story. I don't think *Conestoga wagon* and *Guadaloupe River* qualify.

Professor: What do you say to that, Kate?

Kate: Well, maybe they don't have general value, but I was trying to use them to build up a feeling for the setting of the story, the historical context.

Professor: Do the rest of you think Kate has given a good justification for her choices?

Class: (Several agree that she has.)

This exchange began with one person's inquiry about Kate's decision. It forced Kate to explain her action and gave class members a chance to evaluate it. The professor intentionally turned the evaluation back to the class members. This exchange demonstrates the incorporation of articulation and reflection into the discussion. The remainder of this hypothetical discussion continues to exhibit these features.

The tape begins, showing Kate arriving early and printing the list of words on the blackboard while her students work with their teacher. Kate calls the students to her work area. They arrive, and the lesson begins.

Kate first checks to see if students can pronounce the words. "Are there any words on the board that you're not sure how to say?" asks Kate. One student, Samantha, points to *Guadaloupe River*. Kate first asks about the word *river*. Samantha correctly pronounces it. Kate then says, "Well, whatever this is we know that it is the name of a river."

Tom: Do you think the students understood how you knew it was a river's name?

Kate: Gee, I should have further explained how I knew that. I'll remember that for the next time. I think I do a better job in a subsequent section.

The tape resumes. "This river is the Guadaloupe River," says Kate. Kate then asks the entire group to say the name of the river. They repeat in unison. Mark asks about *Conestoga wagon*. This time Kate says, "What do you know about this pair of words?" Mark shrugs his shoulders. "Well, let's see," says Kate. "What do you know about capital letters?" Mark answers, "They usually are names of things." "Right," says Kate. "Is one of these words capitalized?" "Oh," says Mark. "It's probably the name of a type of wagon." "Good," answers Kate. "It's called a Conestoga wagon." She then gives some characteristics of Conestoga wagons. When the students' questions about pronunciation end, Kate begins providing information about their meaning.

Ted: How do you know the students can pronounce the remaining words?

Kate: (No response.)

Professor: What could you have done, Kate?

Class: (Kate and others provide suggestions.)

The lesson continues. Kate starts with *Conestoga wagon*, asking students to provide some of the characteristics she mentioned earlier. She then goes to *mustang*, the next word on the list.

Nancy: I was wondering if it would be a good idea to group the words *mustang, mare*, and *stallion*.

Mildred: Couldn't you have used a semantic feature analysis?

Susie: In that case, *coyote* could have been included, too.

Professor: What is the purpose of semantic feature analysis?

Mildred: It's to get children to pay attention to similarities and differences in meanings. It's not enough that they just vaguely know that *mare* and *stallion* are names for kinds of horses. They need to know specific distinctions.

Professor: Yes, good answer. We want children to learn to pay attention to fine distinctions in meanings. This is necessary for them to become good, independent word learners. Kate, what about coming to the board and leading us through a feature analysis with these words?

In addition to further representing articulation and reflection about goals in relation to techniques, coaching and scaffolding appear in this section as Kate practices an activity initially suggested by a classmate.

When the tape resumes, Kate is asking questions. "What word is something you could ride?" "Mustang," says Eric. "Stallion," says Samantha. "I could ride in a Conestoga wagon," adds George. "How are mustangs and stallions alike?" asks Kate. "They have four legs," says Tina. "They're both horses," adds Travis. "How are coyotes and mustangs alike?" continues Kate. "They're both wild," offers Eric. "How are they different?" queries Kate. "A coyote couldn't pull a Conestoga wagon," says Samantha. "I'd be afraid to see a coyote but not a mustang," says George.

Kate: I was really pleased with the students' responses. They were creative and interesting to me. I think we were all having fun and learning the vocabulary.

Susie: The pace was good.

Tom: So were the questions.

Professor: Why were they good, Tom?

Tom: Well, they required some reasoning instead of just repeating a definition.

The tape starts again. "Four of the six words will appear again in the story you'll read tomorrow," says Kate.

Professor: Kate, do you think this is the best time to share this information with your students?

Kate: Didn't I tell them at the beginning of the lesson that the words were from their story?

Class: (Several classmates and the professor shake their heads "no.")

Kate: I was so concerned about remembering the vocabulary stuff, I forgot other things we've discussed.

Other students also comment about the amount of information that needs to be integrated for a quality lesson to result. From the questions about her lesson, Kate realizes an important omission. Again, the shared viewing permits addressing this oversight, another dimension of coaching.

The class members return to the tape and hear Kate telling her students to write their own stories, using as many of the words as possible from their list. "We'll listen to some of your stories before reading 'The White Stallion,'" says Kate. Her students return to their desks as the tape ends.

This experience affords more than the implementation of a lesson containing good and improvable points. It provides a forum for prospective teachers to reflect on a teaching experience, share their ideas, support their suggestions, and gain insight into the nature of teaching. The professor's theoretical information comes to life as a result of its contextualization.

Using videotapes in the manner we have sketched incorporates the principles of effective instruction we have espoused--prospective teachers see modeling of authentic practice, they receive coaching and scaffolding as they engage in the activity of teaching, and they have opportunities to develop articulation

and reflection in videotape discussion/critique sessions. The use of videotapes would enable an order of magnitude more authentic practice than is typical in teacher education. Prospective teachers would also receive vastly better coaching and scaffolding than they generally do now. All in all, as a pedagogical tool, well-planned use of videotapes may be better than live lessons and it is certainly better than the typical preservice teacher education.

We have stressed preservice teacher education in this report. The approach applies equally well to *inservice* professional development of experienced teachers. Translating talk about teaching into practice is neither simple nor certain for them either, particularly if the point is subtle, requires a change in beliefs, or entails a substantial modification of the teacher's usual ways of teaching. Moreover, veteran teachers can be jaded. They have received all kinds of advice, much of which may not have worked well, at least as they were able to understand and implement it. Thus, we argue that, like new teachers, experienced teachers, too, are best served by training that features authentic examples and opportunities for authentic practice with coaching and scaffolding.

To recapitulate, our thesis is that there is a gap between talk about teaching that is featured in most preservice teacher education and the working knowledge and problem-solving expertise that characterize skilled teaching. This gap exists, we believe, because typical teacher training does not embody the principles of modeling, coaching, scaffolding, articulation, and reflection. To foster these principles, we propose extensive use of videotapes in teacher education--videotapes of the authentic lessons of practicing teachers and videotapes of aspiring teachers as they struggle with their first real teaching experiences. Videotapes used in the ways we have recommended offer perhaps the most feasible avenue open to improve the quality of teacher education and thus assure higher returns on the nation's investment in literacy.

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